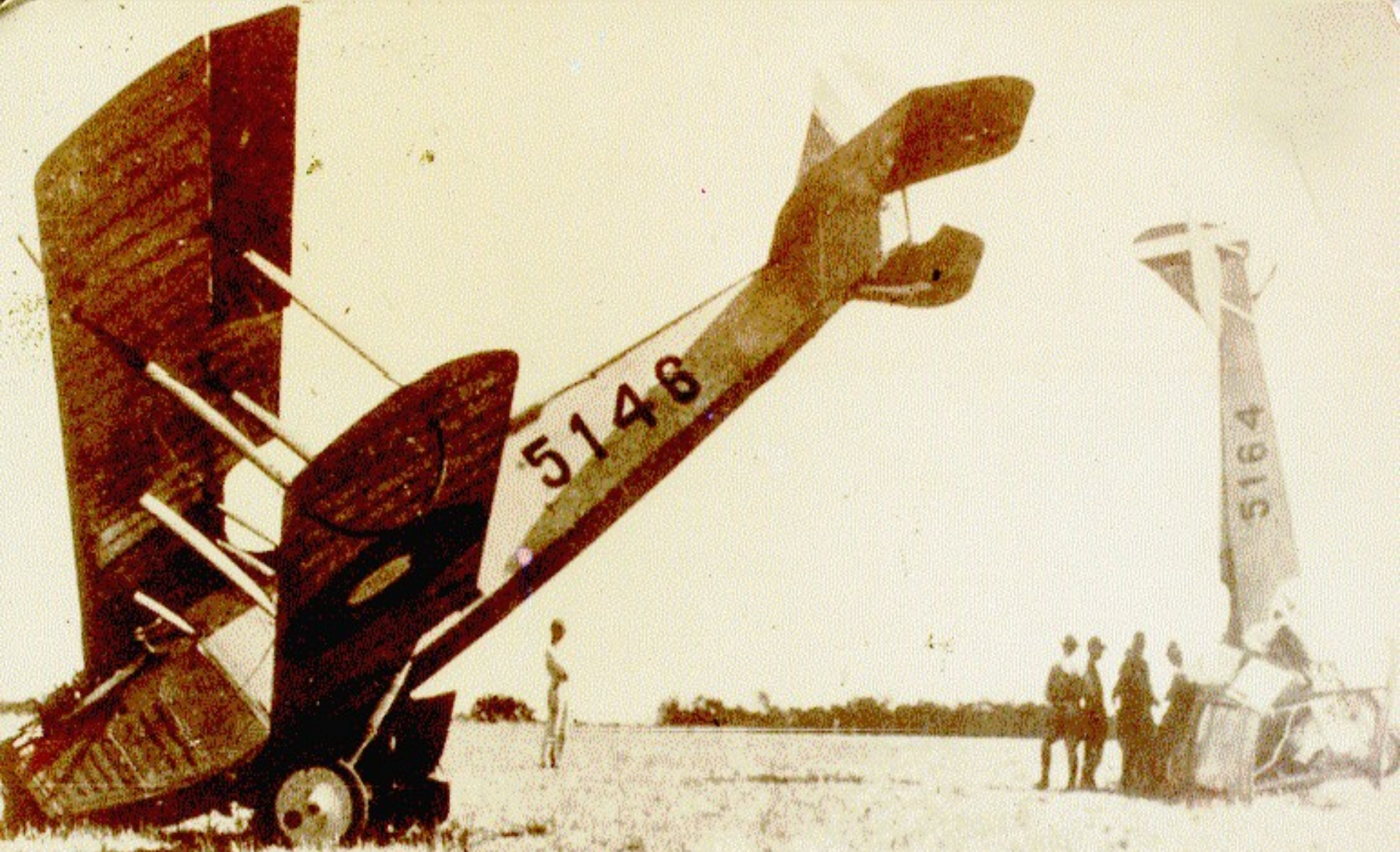


HUMAN FACTORS ANALYSIS AND CLASSIFICATION SYSTEM (HFACS)



***THE FIRST STEP IN THE
RISK MANAGEMENT
PROCESS***



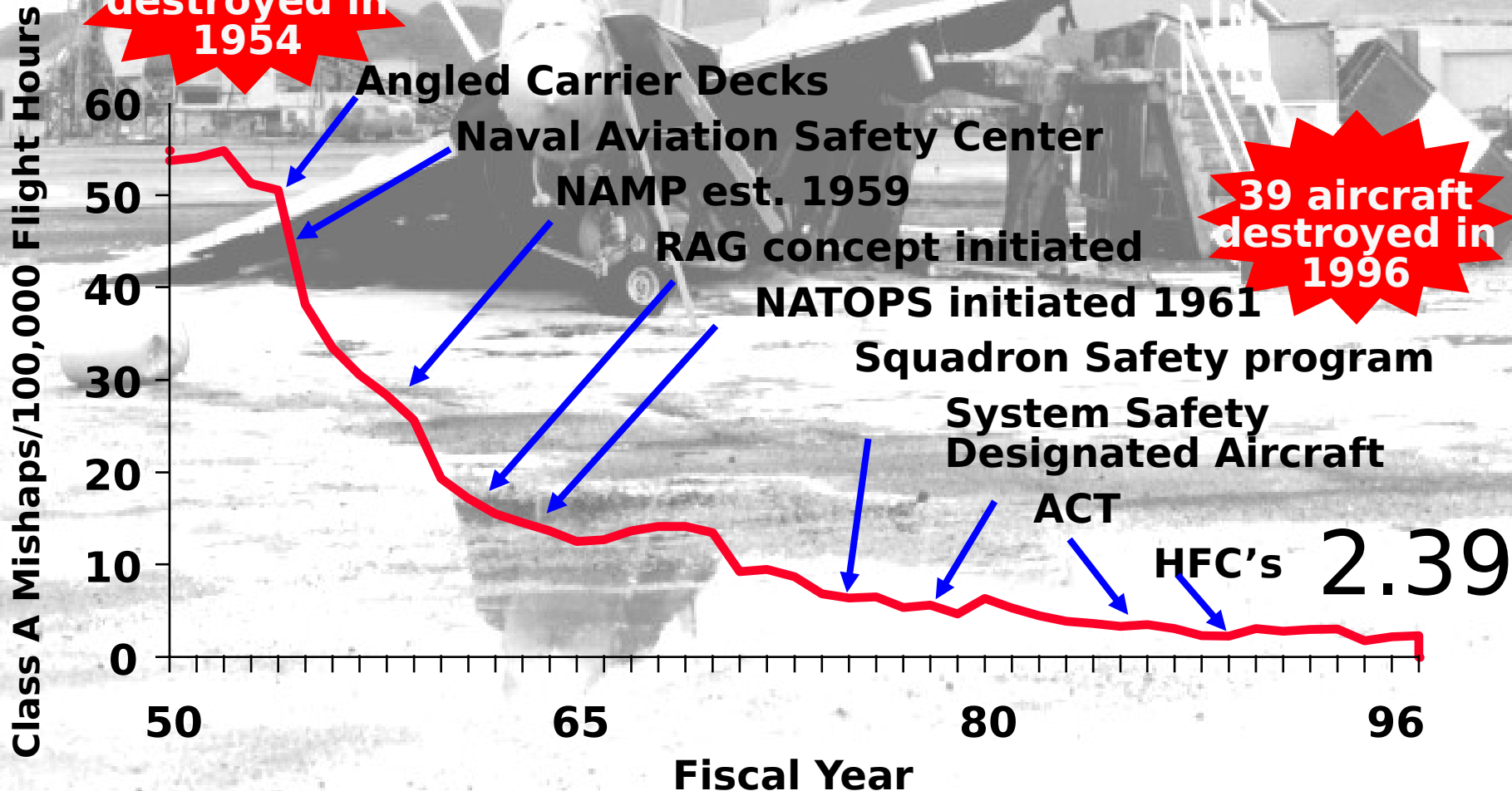
“Human beings by their very nature make mistakes; therefore, it is unreasonable to expect error-free human performance.”

NAVAL AVIATION MISHAP RATE

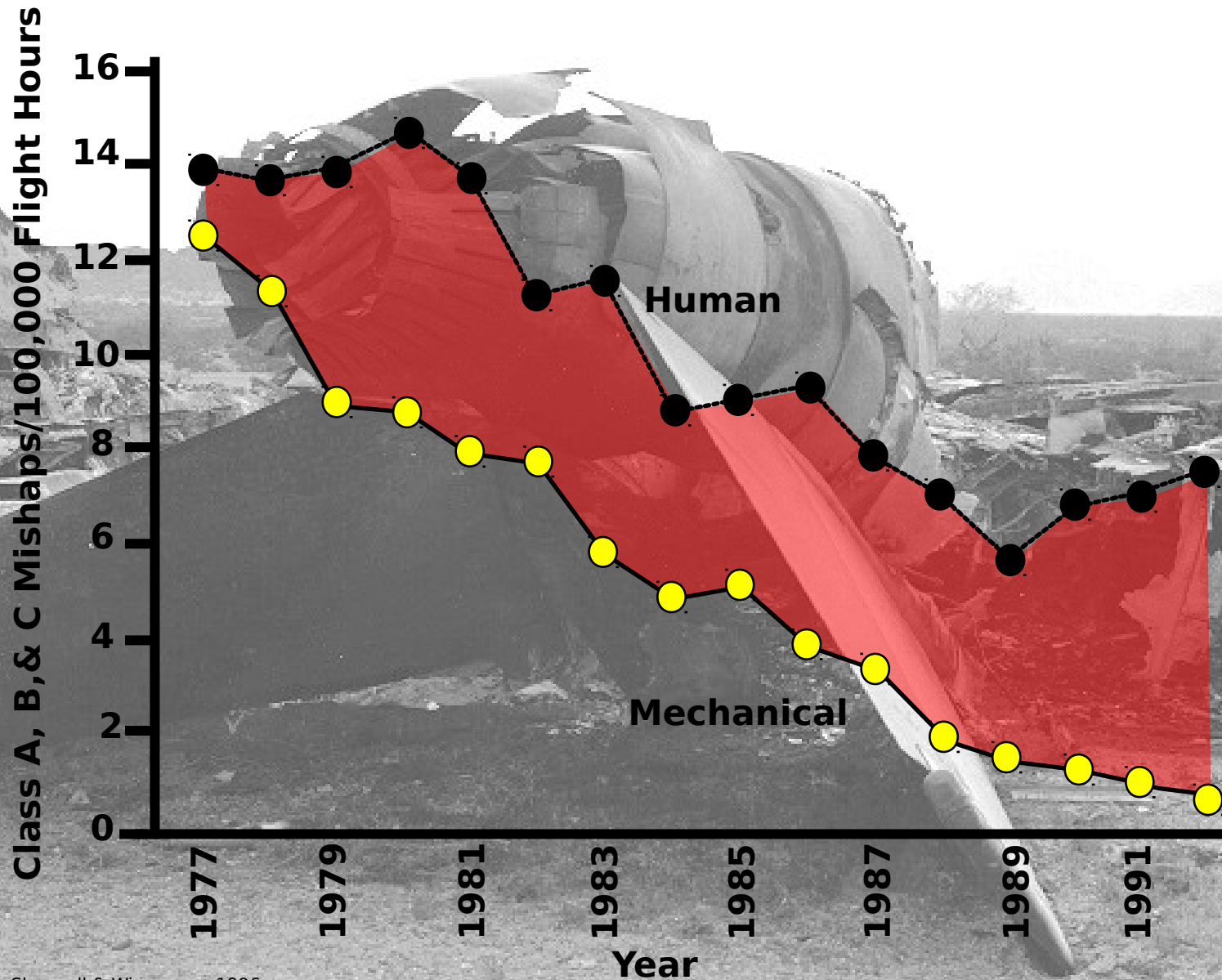
FY 50-96

**776 aircraft
destroyed in
1954**

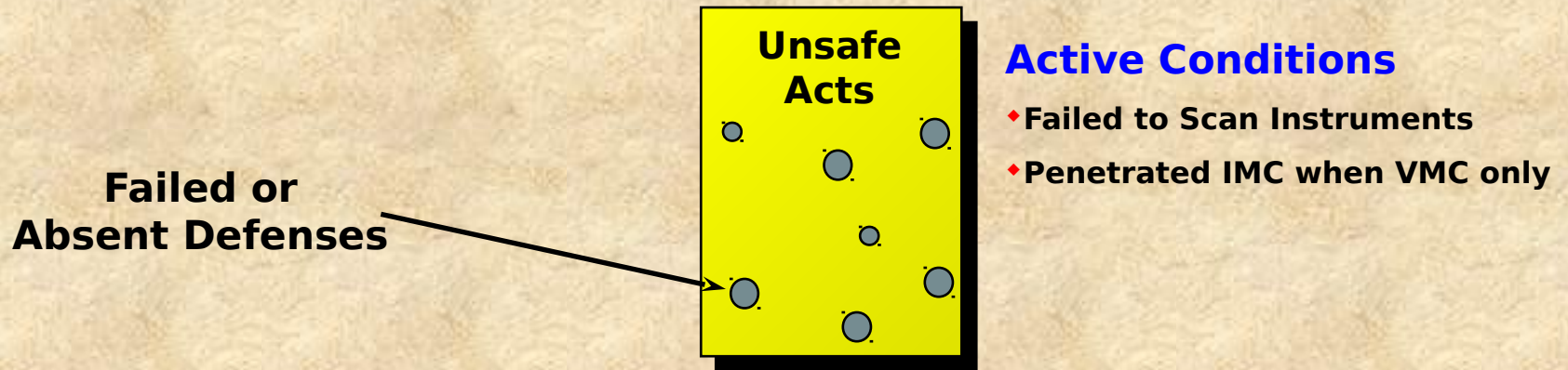
**39 aircraft
destroyed in
1996**



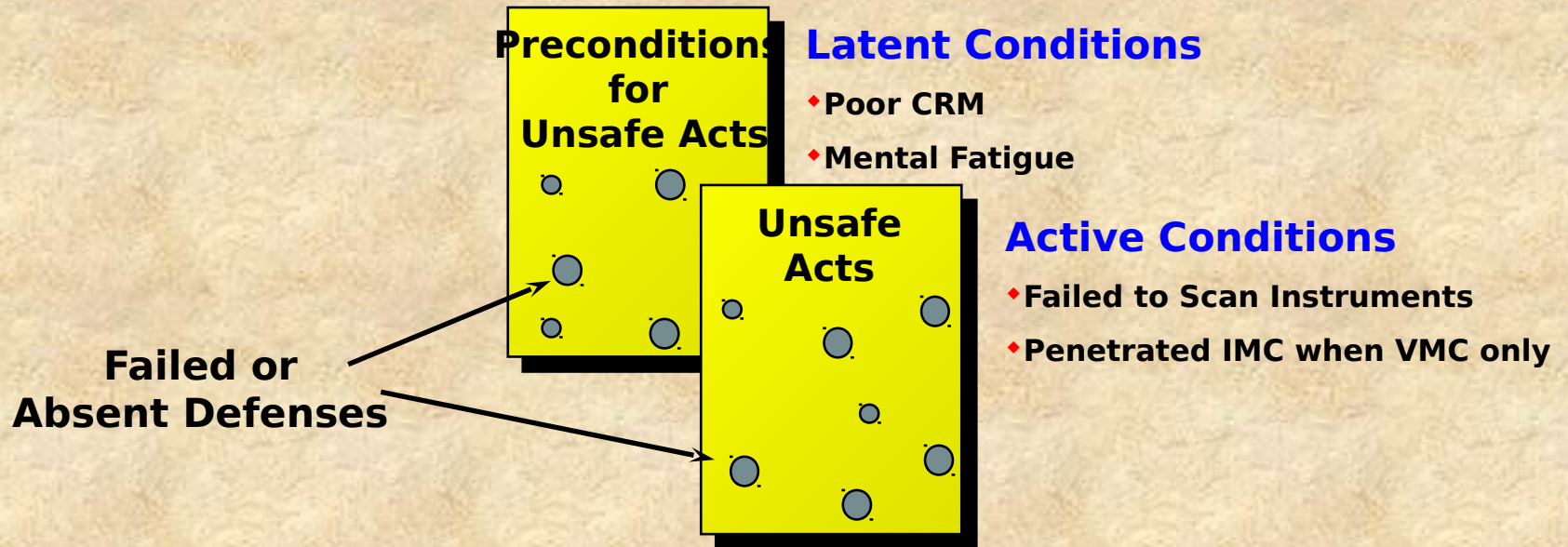
All NAVY/MARINE Class A, B, & C Mishaps



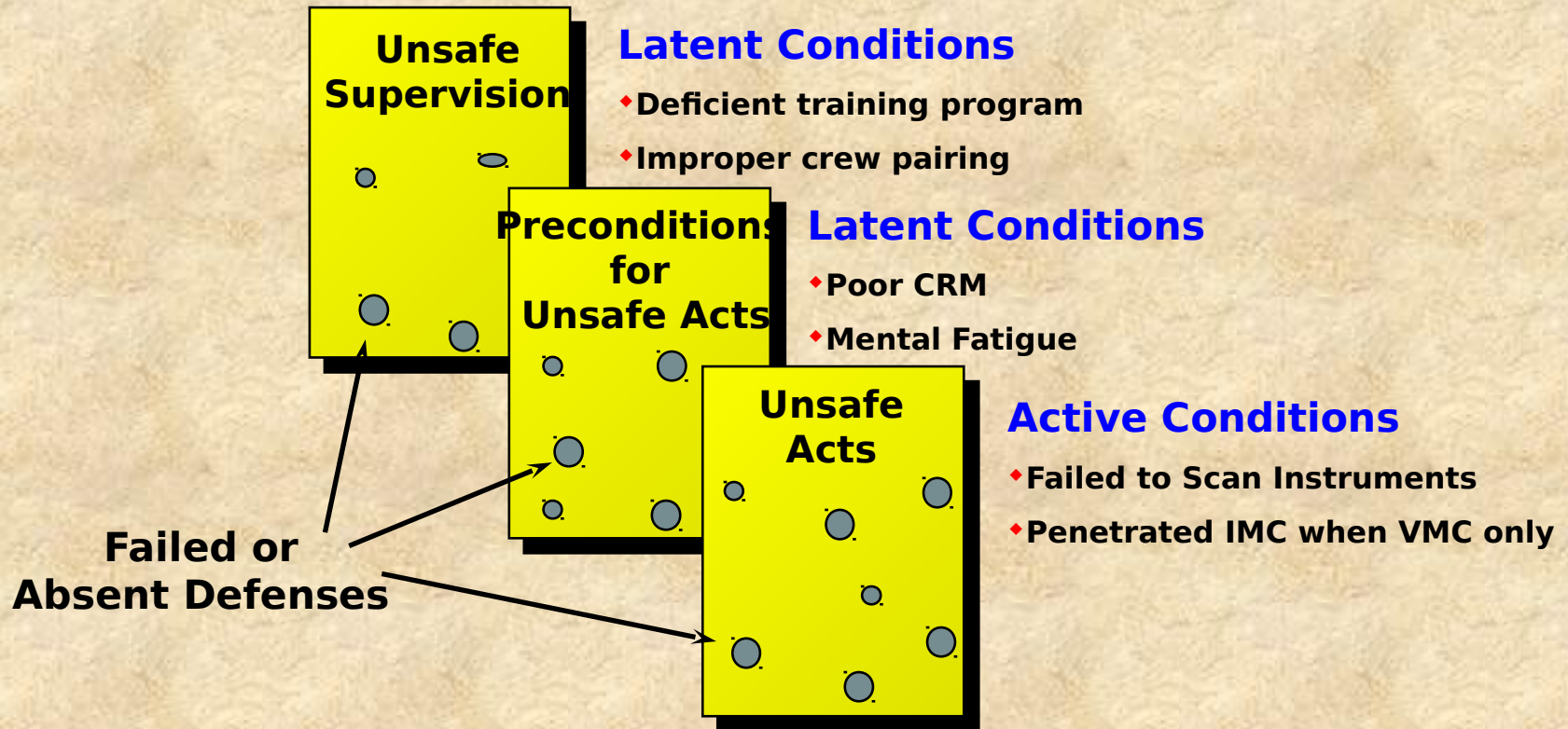
Active versus Latent Failures (Reason, 1990)



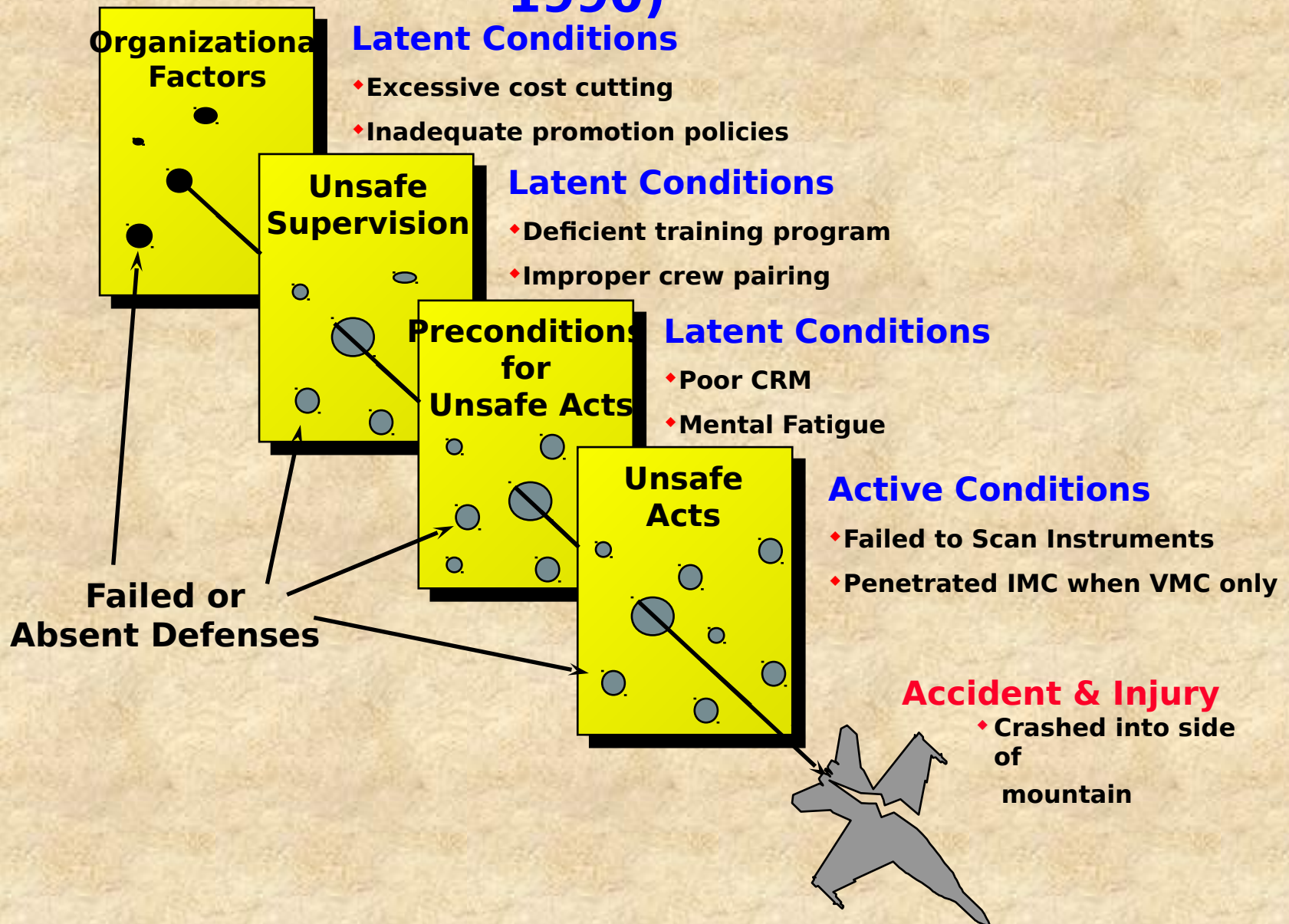
Active versus Latent Failures (Reason, 1990)

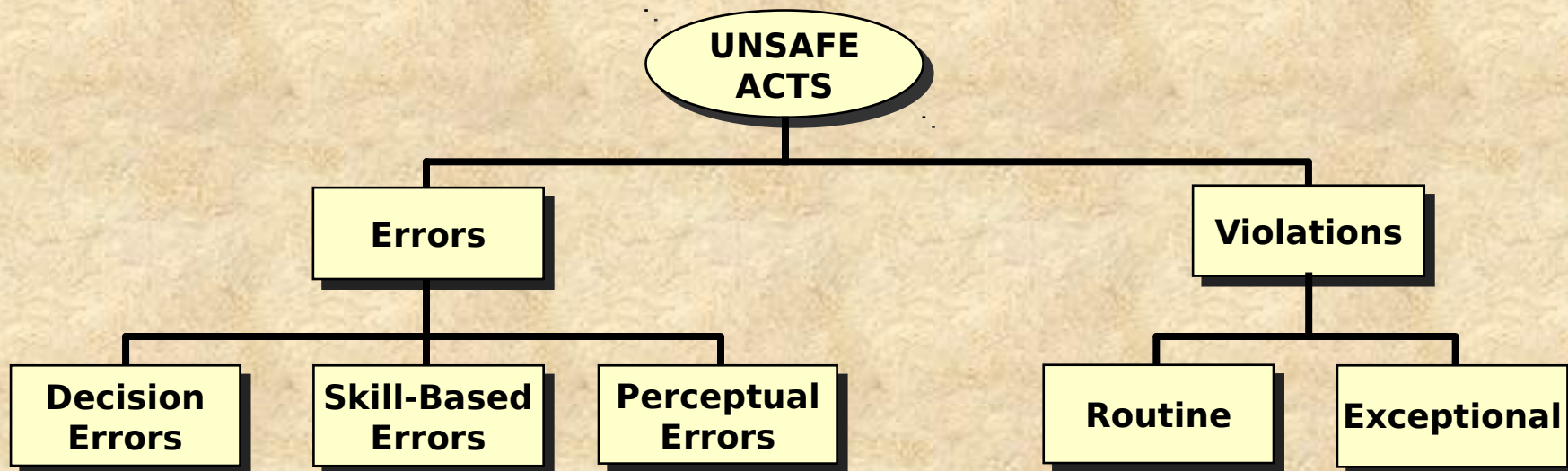


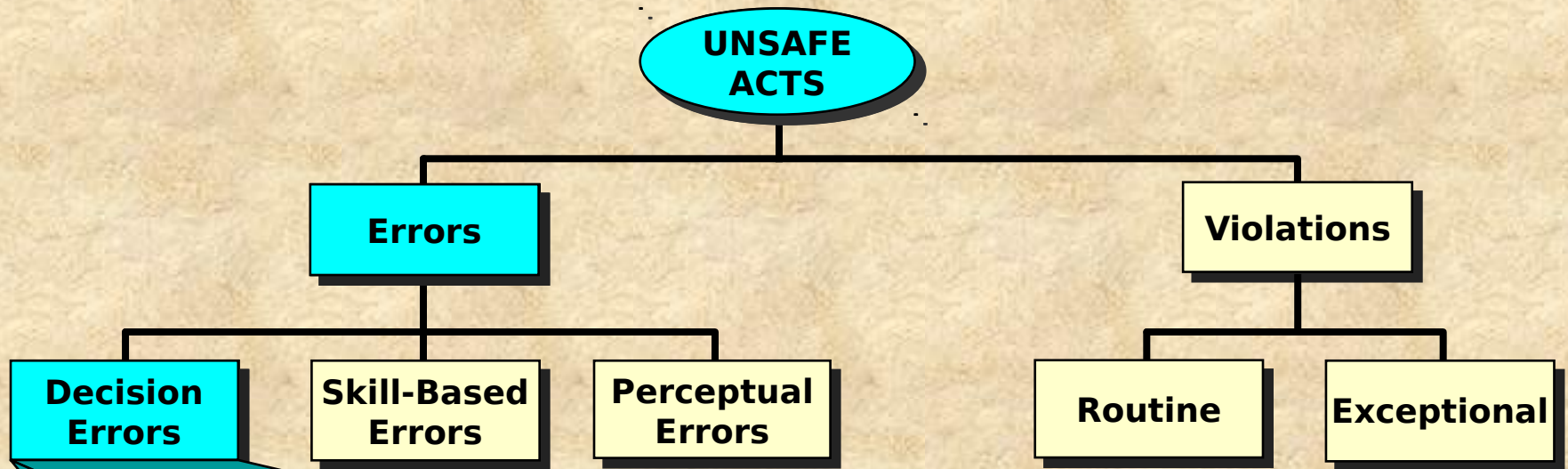
Active versus Latent Failures (Reason, 1990)



Active versus Latent Failures (Reason, 1990)





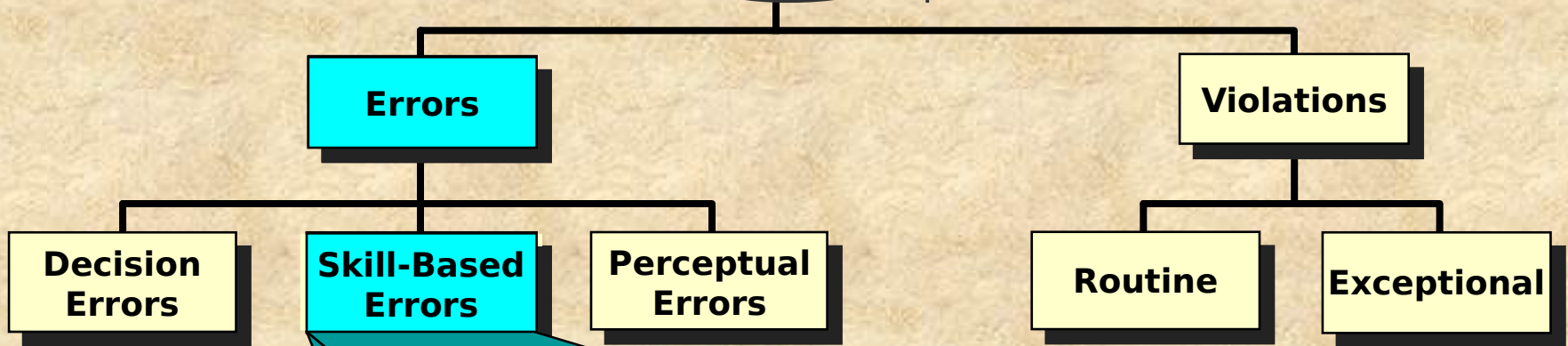


DECISION ERROR

- Rule-based Decisions
 - If X, then do Y
 - Highly Procedural
- Choice Decisions
 - Knowledge-based
- Ill-Structured Decisions
 - Problem solving



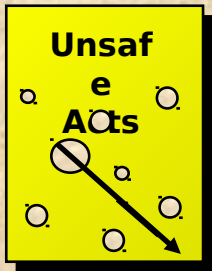
UNSAFE ACTS



Skill-Based Errors

SKILL-BASED ERRORS

- **Attention Failures**
 - Breakdown in visual scan
 - Inadvertent operation of control
 - Failure to see and avoid
- **Memory Failure**
 - Omitted item in checklist
 - Omitted step in procedure



UNSAFE ACTS

Errors

Violations

Decision Errors

Skill-Based Errors

Perceptual Errors

Routine

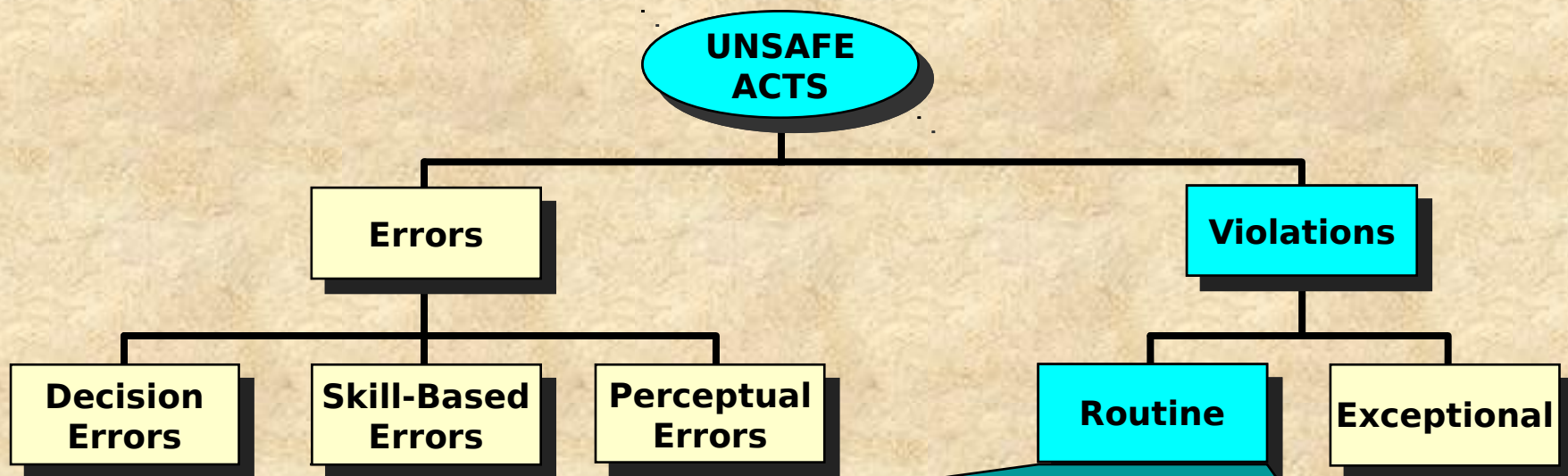
Exceptional

PERCEPTUAL ERRORS

- Misjudge Distance, Altitude, Airspeed
- Spatial Disorientation
- Visual Illusions

Unsafe Acts





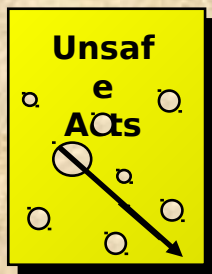
ROUTINE (INFRACTIONS)

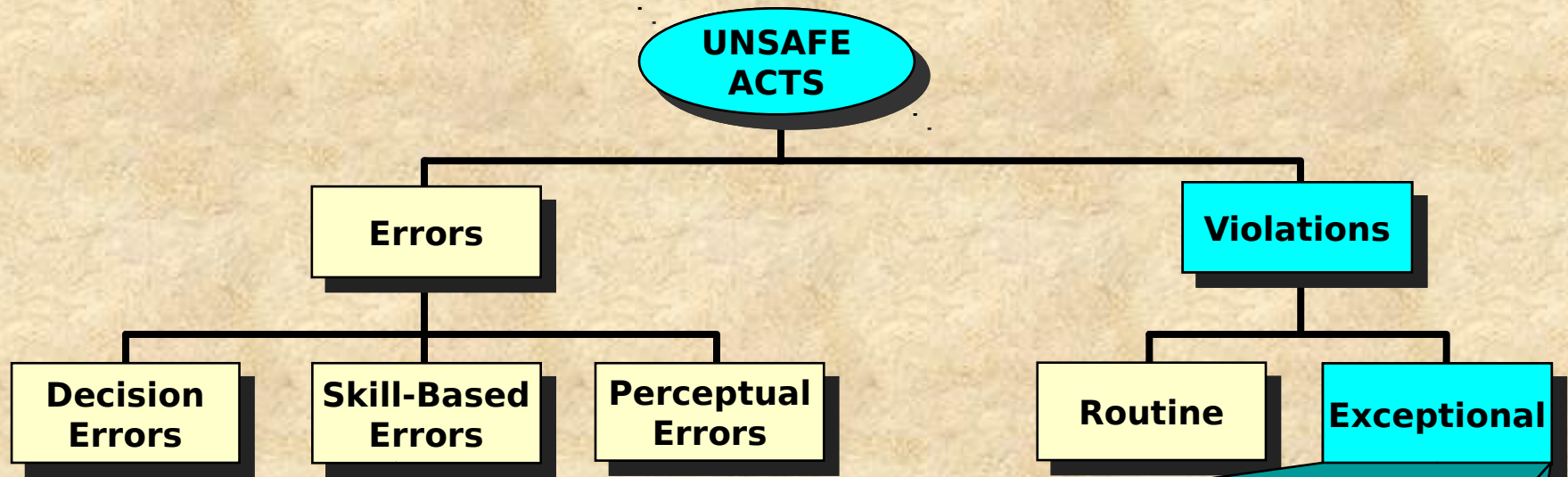
(Habitual departures from rules condoned by management)

➤ Violation of Orders/Regulations/SOP

- Failed to Inspect ACFT after In-Flight Caution Light
- Violated Squadron SOP Restricting Flight Below 500'
- Failed to Comply with NATOPS During Streaming
- Conducted Night Training and Ops Mission with PAX
- Elected to File VFR in Marginal Weather Conditions
- Failed to Use Radar Advisories from ATC
- Inadequate Brief and Limits on Mission
- HAC Knowingly Accepted Non-Current Crew

- ❑ Failed to Adhere to Brief
- ❑ Not Current/Qualified for Mission
- ❑ Improper Procedure





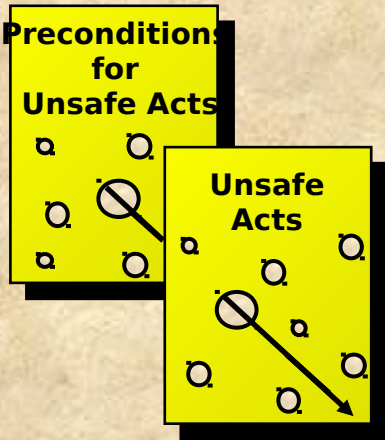
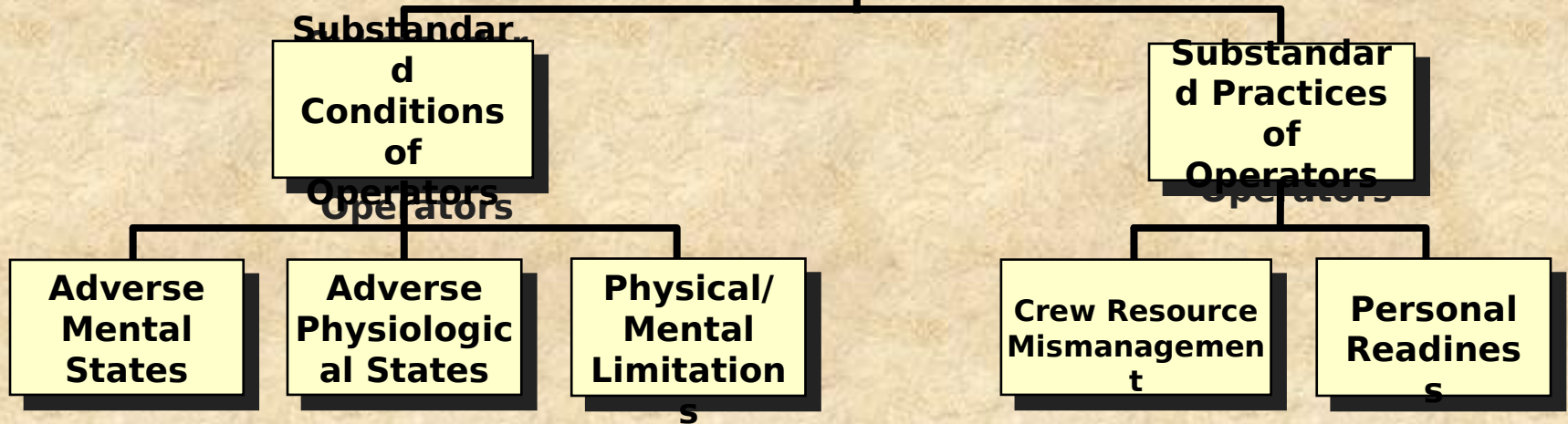
EXCEPTIONAL

(Isolated departures from the rules not condoned by management)

- ▮ Violated NATOPS/Regulations/SOP
 - Performed Unauthorized Acrobatic Maneuver
 - Canyon Running
 - Failed to Complete Performance Computations for Flight
 - Improper Takeoff Technique
 - Failed to Obtain Valid Weather Brief
- ▮ Accepted Unnecessary Hazard
- ▮ Not Current/Qualified for Mission
- ▮ Exceeded Limits of Aircraft



PRECONDITIONS FOR UNSAFE ACTS



PRECONDITIONS FOR UNSAFE ACTS

Substandard Conditions of Operators

**Adverse
Mental
States**

**Adverse
Physiologic
al States**

**Physical/
Mental
Limitation
s**

Substandard Practices of Operators

**Crew Resource
Mismanagement**

**Personal
Readiness**

ADVERSE MENTAL STATE

- Loss of Situational Awareness
- Circadian dysrhythmia
- Alertness (Drowsiness)
- Overconfidence
- Complacency
- Task Fixation

Preconditions
for
Unsafe Acts

Unsafe
Acts



PRECONDITIONS FOR UNSAFE ACTS

Substandard Conditions of Operators

Adverse
Mental
States

Adverse
Physiologic
al States

Physical/
Mental
Limitation
s

Substandard Practices of Operators

Crew Resource
Mismanagement

Personal
Readiness

ADVERSE PHYSIOLOGICAL STATES

- G-induced Loss of Consciousness
- Hypoxia
- Motion Sickness
- Medical Illness
- Intoxication

Preconditions
for
Unsafe Acts

Unsafe
Acts



PRECONDITIONS FOR UNSAFE ACTS

Substandard
Conditions
of
Operators

Substandard
Practices
of
Operators

Adverse
Mental
States

Adverse
Physiologic
al States

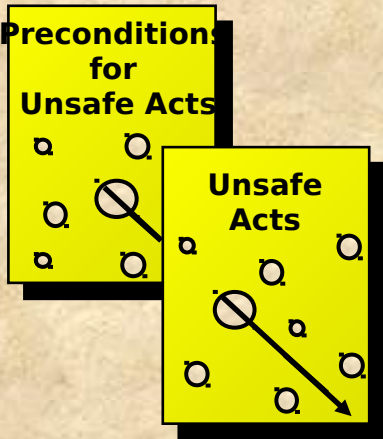
Physical/
Mental
Limitation

Crew Resource
Mismanagem
t

Personal
Readines
s

PHYSICAL/MENTAL LIMITATIONS

- Lack of Sensory Input
- Limited Reaction Time
- Incompatible Physical Capabilities
- Incompatible Intelligence/Aptitude



PRECONDITIONS FOR UNSAFE ACTS

Substandard
Conditions
of
Operators

Adverse
Mental
States

Adverse
Physiologic
al States

Physical/
Mental
Limitation
s

Substandard
Practices
of
Operators

Crew Resource
Mismanagement

Personal
Readiness

CREW RESOURCE MISMANAGEMENT

- Not Working as a Team
- Poor Aircrew Coordination
- Improper Briefing Before a Mission
- Inadequate Coordination of Flight

Preconditions
for
Unsafe Acts

Unsafe
Acts



PRECONDITIONS FOR UNSAFE ACTS

Substandard Conditions of Operators

Adverse
Mental
States

Adverse
Physiologic
al States

Physical/
Mental
Limitation
s

Substandard Practices of Operators

Crew Resource
Mismanagemen
t

Personal
Readiness

PERSONAL READINESS

Readiness Violations

- Crew Rest Requirements
- Bottle-to-Brief Rules
- Self-Medicating

Poor Judgement

- Poor Dietary Practices
- Overexertion While Off
Duty

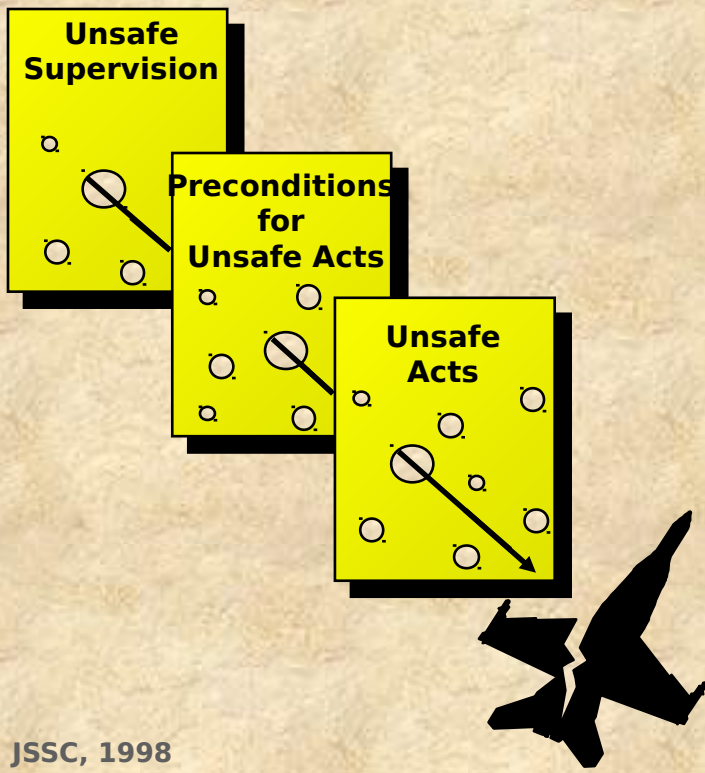
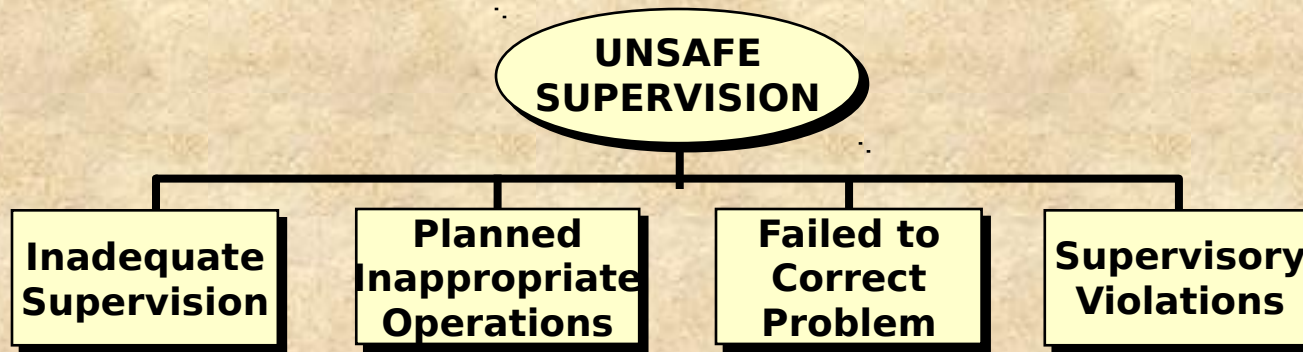
➤ Excessive "Voluntary"

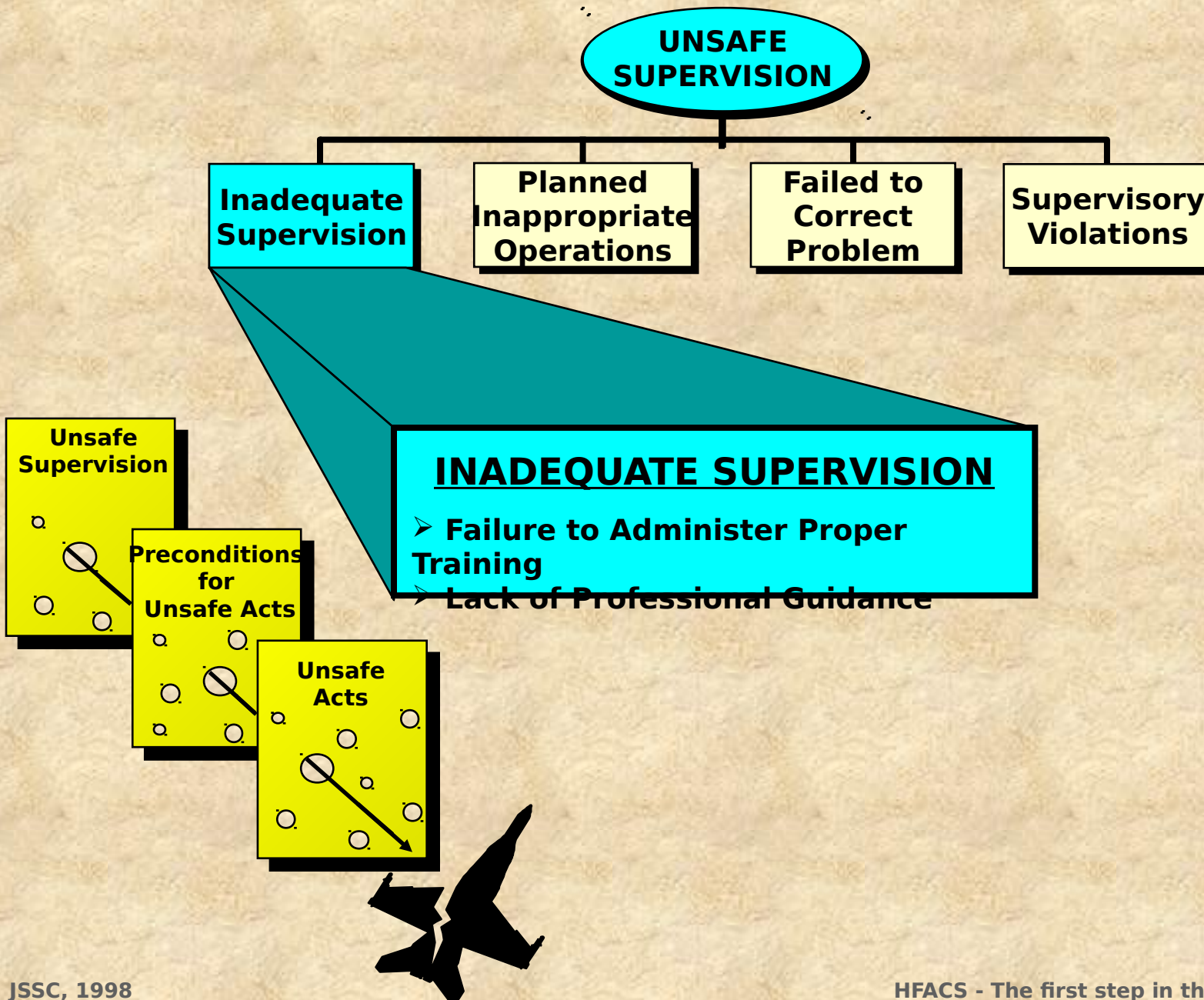
PT

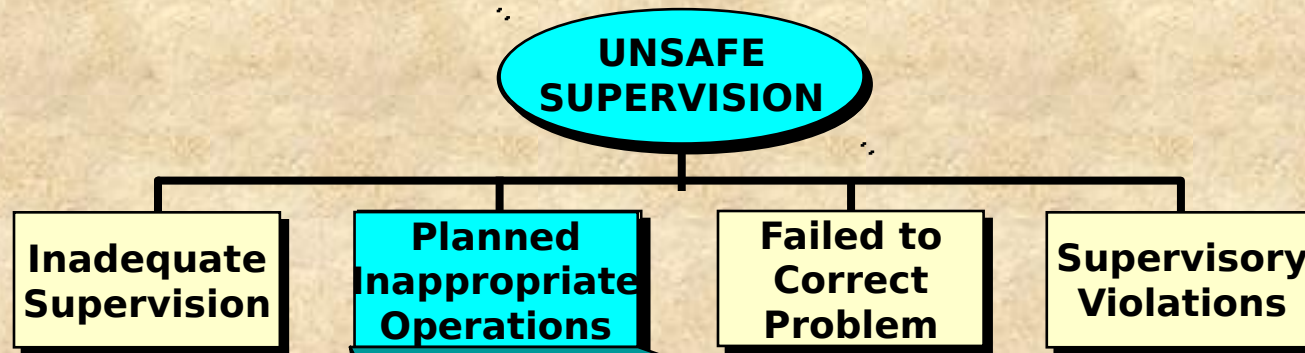
Preconditions
for
Unsafe Acts

Unsafe
Acts



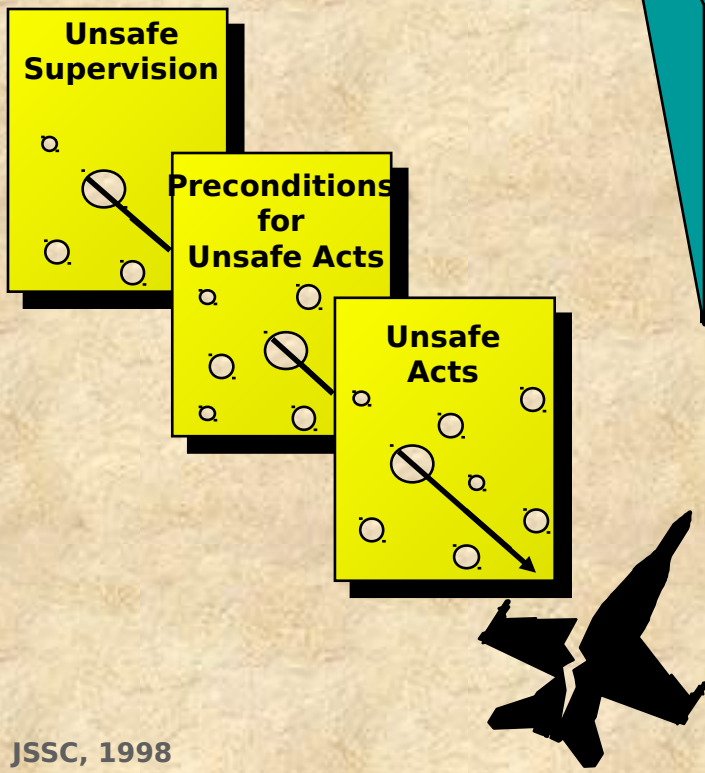


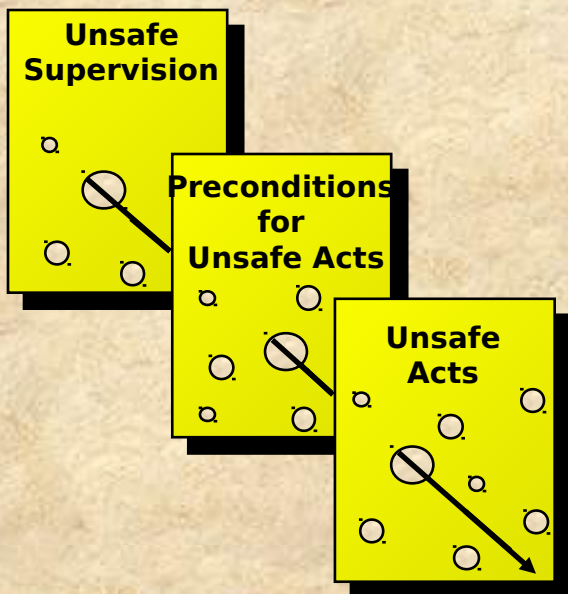
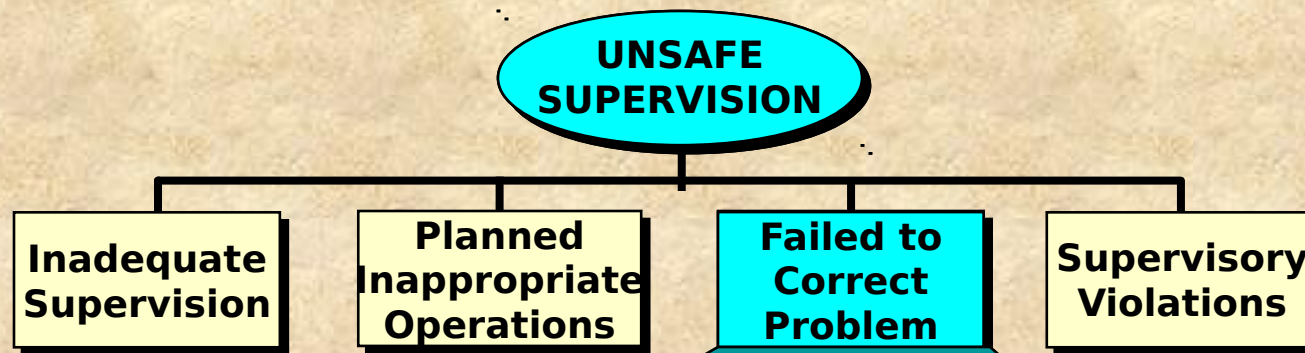


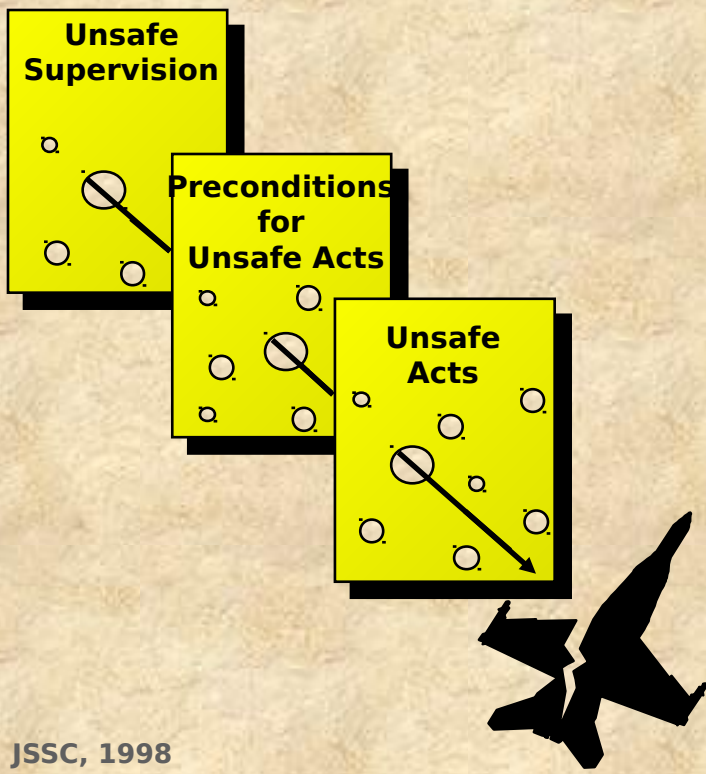
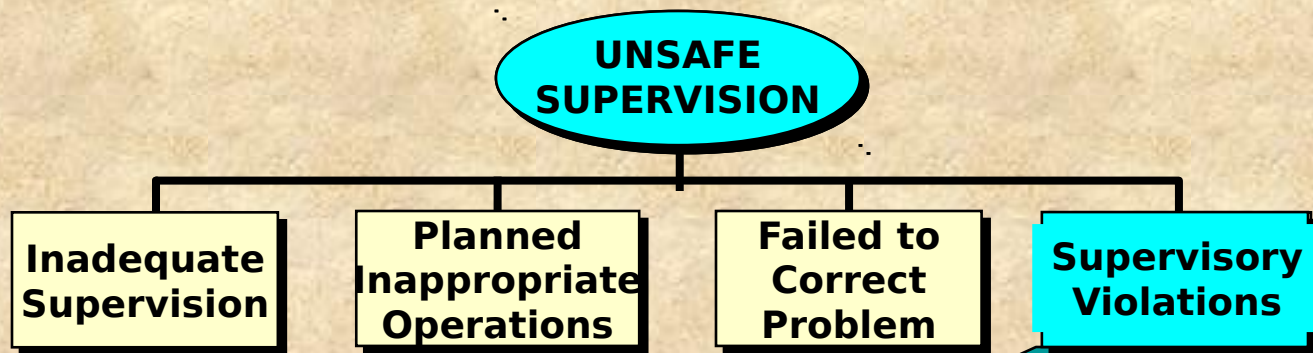


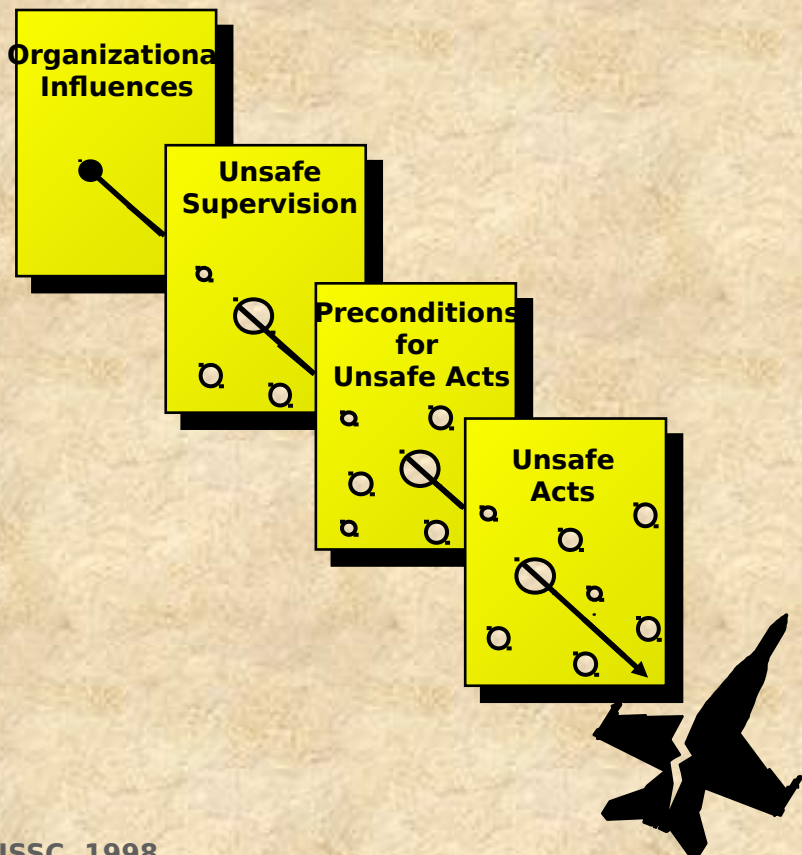
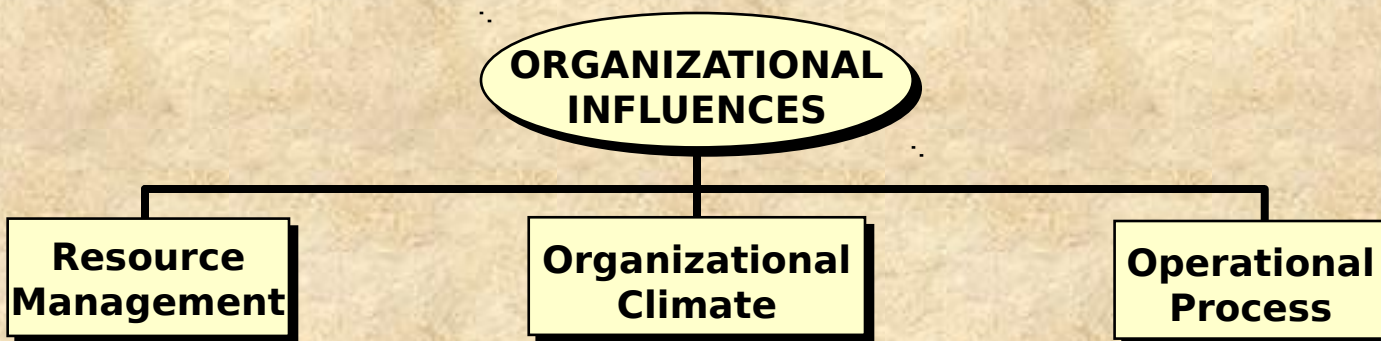
PLANNED INAPPROPRIATE OPERATIONS

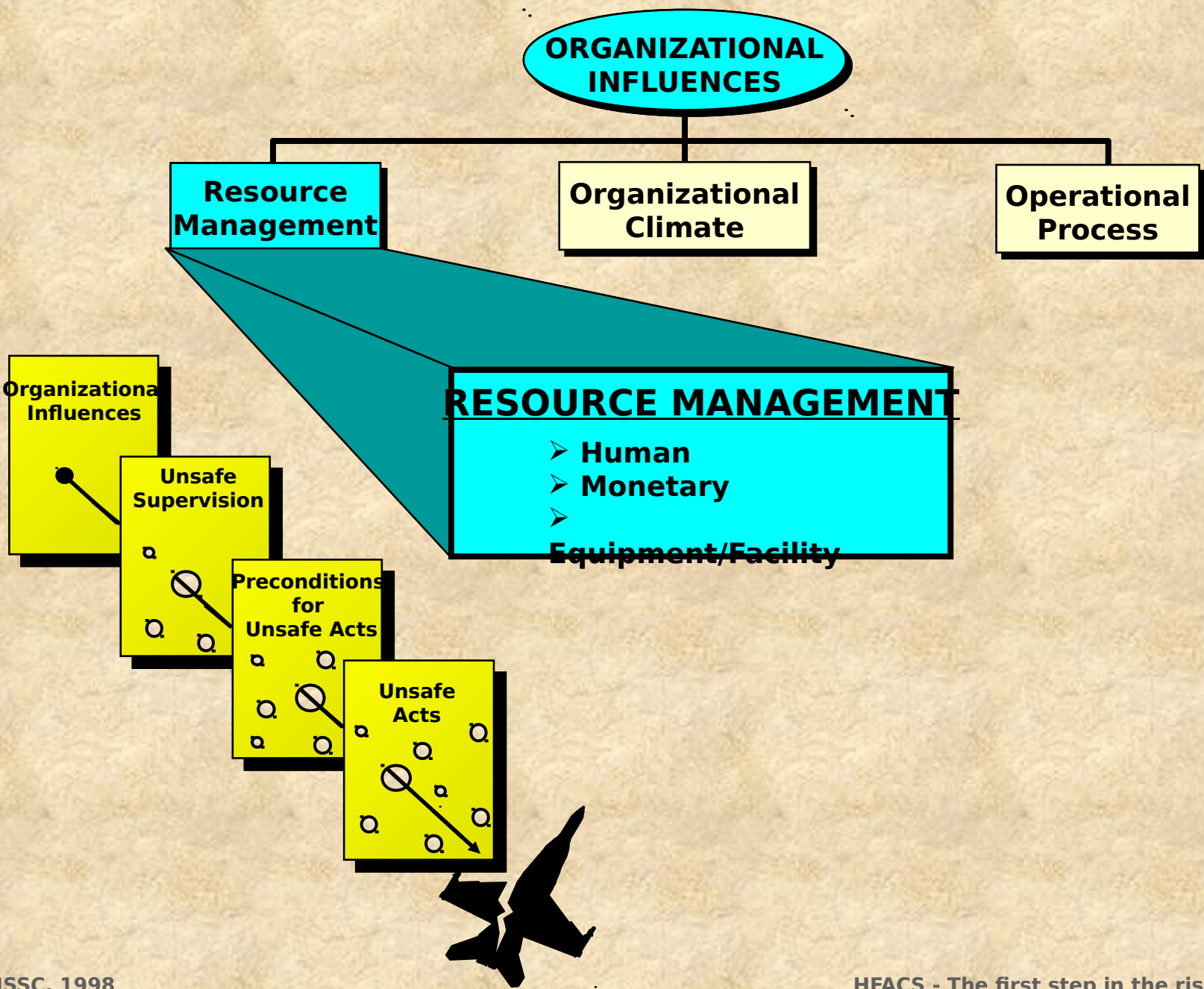
- Mission Risk without Benefit
- Improper Work Tempo
- Poor Crew Pairing

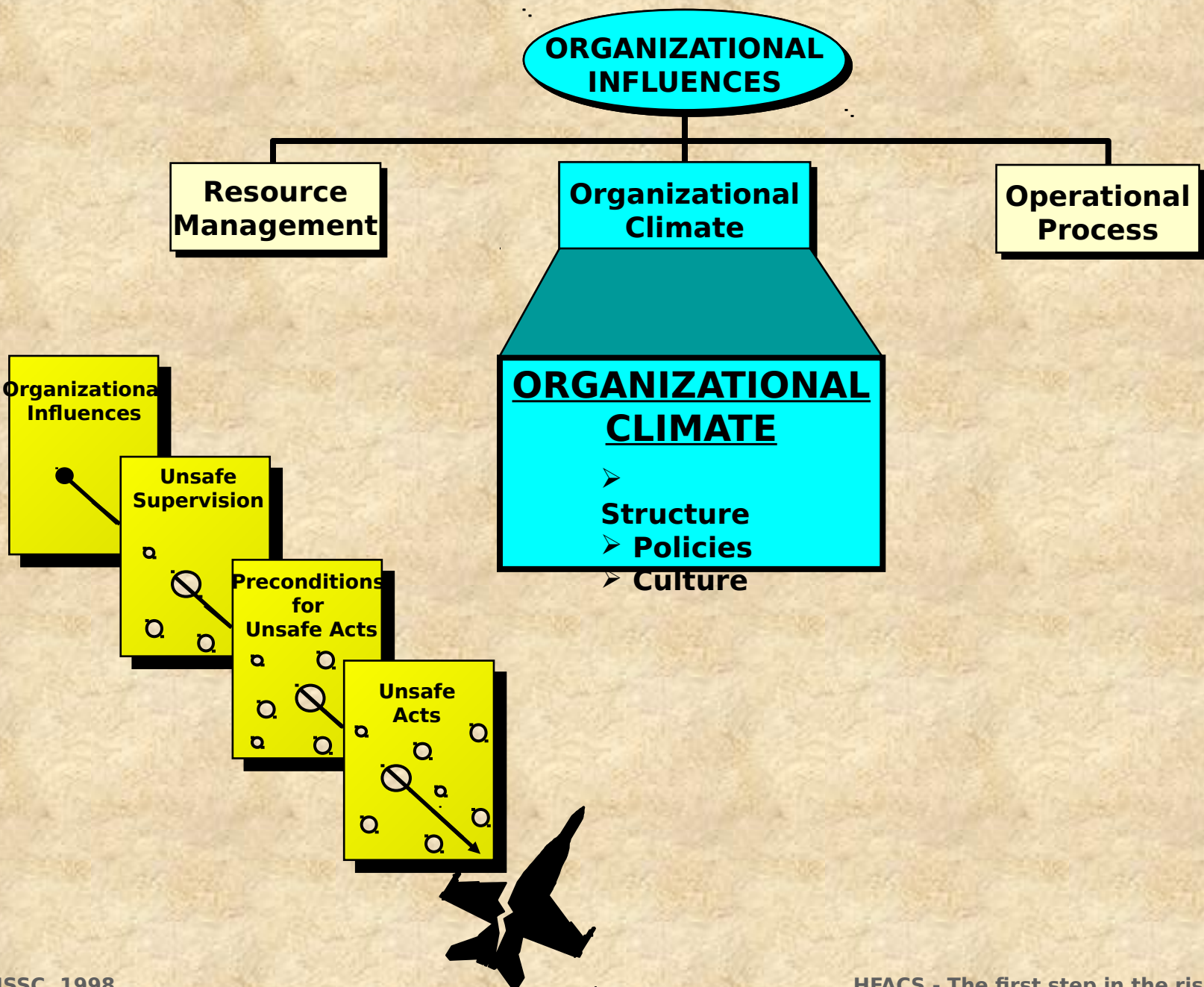


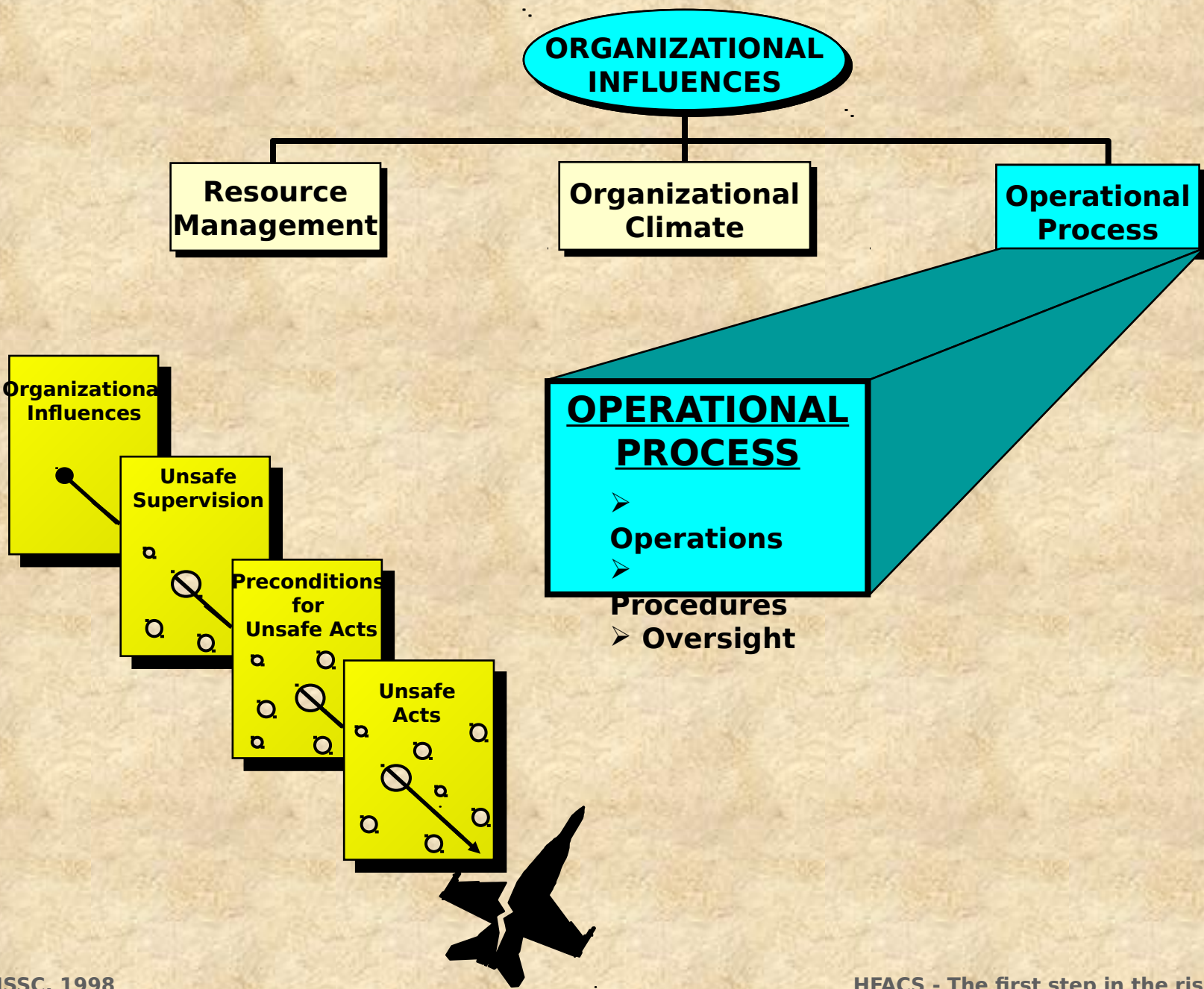


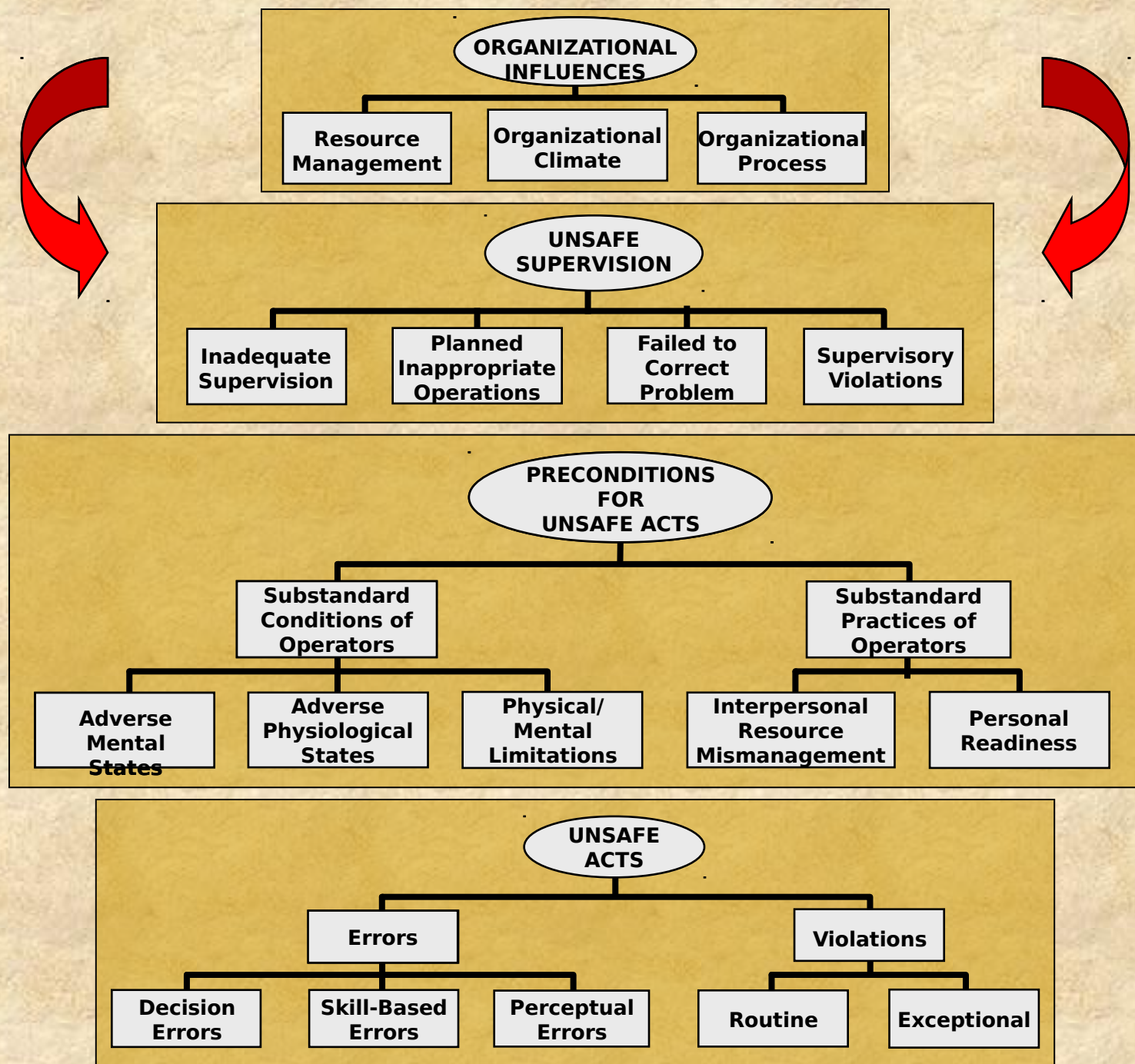












“Whenever we talk about a pilot who has been killed in a flying accident, we should all keep one thing in mind. He...made a judgment. He believed in it so strongly that he knowingly bet his life on it. That his judgment was faulty is a tragedy,...



Every instructor, supervisor, and contemporary who ever spoke to him had the opportunity to influence his judgement, so a little bit of all of us goes with every pilot we lose.”

--Anonymous